

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (currently amended) A method to select a captain control node from a plurality of control nodes, comprising the steps of:

supplying a plurality of host computers, wherein a different one of said plurality of control nodes is disposed in each of said plurality of host computers, and wherein each host computer comprises a storage management program to manage the transfer of data to data storage and retrieval systems;

supplying a plurality of data storage and retrieval systems, wherein each data storage and retrieval system comprises a plurality of host adapters, a plurality of data storage devices, a processor, and a data cache;

supplying a communication link interconnecting each of said plurality of host computers and each of said data storage and retrieval systems;

providing by each of said plurality of control nodes a first signal to each of the other control nodes;

receiving by each of said plurality of control nodes, a response signal from each of the other control nodes;

calculating by each of said plurality of control nodes individual response times for each of the other control nodes;

determining an aggregate response time for each of the plurality of interconnected

control nodes;

determining whether to select a captain control node using said aggregate response times;

operative if the captain control node is selected using said aggregate response times:

determining a minimum aggregate response time; and

designating ~~the a~~ control node having said minimum aggregate response time as the captain control node to coordinate the operations of said plurality of host computers.

2. (previously presented) The method of claim 1, further comprising the steps of:
determining if two or more control nodes each have said minimum aggregate response time;

if two or more control nodes each have said minimum aggregate response time,
repeating the steps of claim 1.

3. (previously presented) The method of claim 1, further comprising the steps of:
calculating by each of said plurality of control nodes a standard deviation for that
control node's aggregate response time;
providing said standard deviation by each control node to each of the remaining control
nodes.

4. (previously presented) The method of claim 3, further comprising the steps of:
operative if two or more control nodes each have the minimum aggregate response time,
determining which of said two or more control nodes has ~~the~~ a smallest standard deviation;
designating the control node having the minimum aggregate response time and the
smallest standard deviation as the captain control node.

5. (previously presented) The method of claim 1, further comprising the steps of:
 - operative if the captain control node is not selected using said aggregate response times,
 - providing a captain control node selection function;
 - determining a performance score for each of the plurality of control nodes using said captain control node selection function;
 - designating a control node having a minimum performance score as the captain control node.

6. (original) The method of claim 5, wherein said captain control node selection function comprises the equation:

Performance Score = a(aggregate response time)^c + b(standard deviation)^d
wherein a, b, c and d are positive constants.

7. Canceled.
8. Canceled.
9. Canceled.
10. (currently amended) An article of manufacture comprising a host computer comprising a control node and a storage management program to manage the transfer of data to data storage and retrieval systems, wherein said host computer is interconnected by a communication link with a plurality of other host computers each comprising a control node, and wherein said host computer is further interconnected by said communication link with a plurality of data storage and retrieval systems, said host computer further comprising a computer useable medium having computer readable program code disposed therein to select a captain control node from said plurality of control nodes, wherein each data storage and

retrieval system comprises a plurality of host adapters, a plurality of data storage devices, a processor, and a data cache, the computer readable program code comprising a series of computer readable program steps to effect:

providing a first signal to each of the other control nodes;

receiving a response signal from each of the other control nodes;

calculating individual response times for each of the other control nodes;

determining an aggregate response time for said article of manufacture;

receiving an aggregate response times from each of the other control nodes;

determining whether to select a captain control node using said aggregate response times;

operative if the captain control node is selected using said aggregate response times, determining the minimum aggregate response time;

operative if the captain control node is selected using said aggregate response times, designating a control node having said minimum aggregate response time the captain control node to coordinate the operations of said plurality of host computers.

11. (previously presented) The article of manufacture of claim 10, said computer readable program code further comprising a series of computer readable program steps to effect:

determining if two or more control nodes each have said minimum aggregate response time;

if two or more control nodes each have said minimum aggregate response time, repeating the steps of claim 10.

12. (previously presented) The article of manufacture of claim 10, said computer readable program code further comprising a series of computer readable program steps to effect:

calculating a standard deviation for said aggregate response time for said article of manufacture; and

receiving standard deviations from each of the other control nodes.

13. (previously presented) The article of manufacture of claim 12, said computer readable program code further comprising a series of computer readable program steps to effect:

operative if two or more control nodes each have said minimum aggregate response time, determining which of said two or more control nodes has a smallest standard deviation;

designating the control node having said minimum aggregate response time and the smallest standard deviation as the captain control node.

14. (previously presented) The article of manufacture of claim 10, said computer readable program code further comprising a series of computer readable program steps to effect:

operative if the captain control node is not selected using said aggregate response times, retrieving a captain control node selection function;

determining a performance score for each of the plurality of control nodes using said captain control node selection function;

designating a control node having a minimum performance score as the captain control node.

15. (original) The article of manufacture of claim 14, wherein said captain control node selection function comprises the equation:

$$\text{Performance Score} = a(\text{aggregate response time})^c + b(\text{standard deviation})^d$$

wherein a, b, c and d are positive constants

16. Canceled.

17. Canceled.

18. Canceled.

19. (currently amended) A computer program product embodied in a computer readable medium disposed in a host computer comprising a control node and a storage management program to manage the transfer of data to data storage and retrieval systems, computer readable medium and usable with a computer processor, wherein said host computer is interconnected by a communication link with a plurality of other host computers each comprising a control node and a storage management program to manage the transfer of data to data storage and retrieval systems, and wherein said host computer is further interconnected by said communication link with a plurality of data storage and retrieval systems, wherein each data storage and retrieval system comprises a plurality of host adapters, a plurality of data storage devices, a processor, and a data cache, said computer program product being useable to select a captain control node from a plurality of control nodes, comprising:

computer readable program code which causes said programmable computer processor to provide a first signal to each of the other control nodes;

computer readable program code which causes said programmable computer processor to receive a response signal from each of the other control nodes;

computer readable program code which causes said programmable computer processor to calculate individual response times for each of the other control nodes;

computer readable program code which causes said programmable computer processor to determine an aggregate response time for said host computer;

computer readable program code which causes said programmable computer processor to receive an aggregate response times from each of the remaining control nodes;

computer readable program code which causes said programmable computer processor to determine whether to select a captain control node using said aggregate response times;

computer readable program code which, if the captain control node is selected using said aggregate response times, causes said programmable computer processor to determine the minimum aggregate response time; and

computer readable program code which, if the captain control node is selected using said aggregate response times, causes said programmable computer processor to designate the control node having a minimum aggregate response time as said captain control node to coordinate the operations of said plurality of host computers.

20. (original) The computer program product of claim 19, further comprising:

computer readable program code which causes said programmable computer processor to determine if two or more control nodes each have the minimum aggregate response time;

computer readable program code which, if two or more control nodes each have the minimum aggregate response time, causes said programmable computer processor to repeat the steps of claim 19.

21. (previously presented) The computer program product of claim 19, further

comprising:

computer readable program code which causes said programmable computer processor to calculate a standard deviation for said aggregate response time for said host computer;

computer readable program code which causes said programmable computer processor to receive a standard deviations from each of the other control nodes.

22. (previously presented) The computer program product of claim 21, further comprising:

computer readable program code which, if two or more control nodes each have a minimum aggregate response time, causes said programmable computer processor to determine which of said two or more control nodes has a lowest standard deviation;

computer readable program code which causes said programmable computer processor to designate the control node having the minimum aggregate response time and the lowest standard deviation as the captain control node.

23. (previously presented) The computer program product of claim 19, further comprising:

computer readable program code which, if the captain control node is not selected using said aggregate response times, causes said programmable computer processor to retrieve a pre-determined captain control node selection function;

computer readable program code which causes said programmable computer processor to determine a performance score for each of the plurality of control nodes using said captain control node selection function;

computer readable program code which causes said programmable computer processor

to designate a control node having a minimum performance score as the captain control node.

24. (original) The computer program product of claim 23, wherein said captain control node selection function comprises the equation:

$$\text{Performance Score} = a(\text{aggregate response time})^c + b(\text{standard deviation})^d$$

wherein a, b, c and d are positive constants.

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